

Application Serial No: 10/754,403
Responsive to the Office Action mailed on: May 28, 2008

REMARKS

This Amendment is in response to the Office Action mailed on May 28, 2008. Claims 1 and 2 are amended editorially and are supported, for example, in the specification on page 5, line 34-page 6, line 11, page 7, line 35-page 8 line 10 and in Figures 1 and 2. No new matter is added. Claims 1-22 are pending.

§103 Rejections:

Claims 1-5 and 8-20 are rejected as being unpatentable over Voss (US Patent No. 7,233,354) in view of Fossum (US Patent No. 5,949,483). This rejection is traversed.

Claims 1 and 2 are each directed to a solid-state imaging device that requires, among other features, a plurality of adding circuits for adding pixel signal charges each comprising an adding portion, a gain control portion and a storage portion, so that an output signal of the adding portion is subjected to a gain control by the gain control portion and then stored directly in the storage portion. A gain of each adding circuit in a condition in which a quantity of the incident light is above a reference quantity is controlled directly with a gain control signal generated from a gain control circuit provided outside the plurality of adding circuits in claim 1 and inside the imaging region in claim 2. An advantage of having a gain control portion in each of a plurality of adding circuits is that each adding circuit can be controlled individually for each partial region in the imaging region. Thus, a dynamic range for each partial region in the imaging region can be expanded, resulting in a higher image quality. Also, an advantage of having the output signal of the adding portion stored directly in the storage portion after gain control by a gain control portion is that excellent signal quality is maintained when the signal is read out from the storage portion.

The combination of Voss and Fossum does not teach or suggest these features. Voss is directed to a digital camera in which a gain of a variable analog amplifier (26) is set by a microprocessor (32) through a D/A converter (30), when an adjustment in CMOS pixel resolution is performed such that a plurality of pixels are combined into a group based on a quantity of incident light according to a look-up table (step 130) (see Figures 1, 1A and 2A-C of Voss). Voss also teaches that the gain of the variable analog amplifier 26 is controlled indirectly by the microprocessor 32, which also functions as the adding

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circuit. The rejection interprets the CMOS 24 as the imaging region of claims 1 and 2, and the CMOS sensor 24, variable analog amplifier 26, A/D converter 28, microprocessor 32 and memory card 38 together as an adding circuit. However, nowhere does Voss contemplate a solid-state imaging device with a plurality of adding circuits. Accordingly, Voss also cannot contemplate a gain control portion inside each of a plurality of adding circuits combined with a gain control adding circuit provided outside the plurality of adding circuits, as required by claim 1, or inside the imaging region, as required by claim 2. Moreover, Voss does not teach or suggest an output signal of an adding portion is subjected to a gain control by the gain control portion and then stored directly in the storage portion, as required by claims 1 and 2. In contrast, Voss teaches that signals outputted from a CMOS sensor 24 travel through the variable analog amplifier 26 to be subjected to gain control and then to the microprocessor 32 to be added to other signals before being stored in an internal memory 36. For at least these reasons claims 1 and 2 are not suggested by the combination of Voss and Fossum. Claims 3-5, 8-11, 19 and 21 depend from claim 1 and should be allowed for at least the same reasons. Claims 12-18, 20 and 22 depend from claim 2 and should be allowed for at least the same reasons.

Claims 6 and 7 are rejected as being unpatentable over Voss in view of Fossum and further in view of Takayama (US Patent No. 7,088,395). This rejection is traversed. Claims 6 and 7 depend from claim 1 and should be allowed for at least the same reasons described above. Applicants do not concede the correctness of this rejection.

Claims 21 and 22 are rejected as being unpatentable over Voss in view of Fossum and further in view of Sharma (US Publication No. 2004/0008542). This rejection is traversed. Claims 21 and 22 depend from claims 1 and 2, respectively, and should be allowed for at least the same reasons described above. Applicants do not concede the correctness of this rejection.

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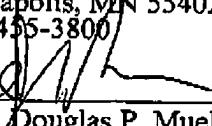
Conclusion:

Applicants respectfully assert that claims 1-22 are in condition for allowance. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 455-3804.

Respectfully submitted,



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